

Administered Prices, Inflation and the Business Cycle – Selected Aspects

Friedrich Fritzer¹

The public sector plays a central role in price-setting in some markets for goods and services. Consequently, Eurostat began to publish a new series of inflation indices referred to as the HICP-AP in early 2010 that summarizes the development of publicly administered prices. This study presents a detailed account of the concept underlying the new series and provides a cross-country analysis for the euro area.

Administered prices are a key component of the HICP basket, currently accounting for 11.0% of the HICP (euro area average). This share has declined in the past decade in line with the liberalization of goods and service markets.

The inflation rates of administered prices and those of flexible prices (i.e. the HICP excluding administered prices) differ with respect to both their levels and their development over time. In many euro area countries, the average HICP-AP rate of inflation has surpassed the all-items HICP inflation rate over the past ten years.

In Austria, as in other euro area countries, flexible prices are found to be a leading indicator for the HICP rather than vice-versa. As public sector pricing takes place within a macroeconomic context, this study also represents a first effort to shed light on the main economic determinants of the development of the HICP-AP. The key findings are that cost-push shocks exercise a significant influence on the inflation of flexible prices, whereas their influence on administered prices is smaller or statistically not significantly different from zero.

JEL classification: E31

Keywords: price level, inflation, deflation

The objective of this study is to present the concept of administered price inflation, as measured by the HICP-AP, to a broader public. Additionally, the study examines and highlights differences in the development of the HICP-AP within the euro area. Finally, a first econometric analysis of administered prices is performed, in particular to examine the influence of cost-push and demand-pull shocks on the development of the HICP-AP and, to provide a comparison, on the development of flexible prices (the HICP without administered prices – HICP-Flex).

Previous analyses of the HICP-AP have concentrated on issues of index construction or composition (Branchi and Wirtz, 2006), but hardly any descriptive statistics on the development

of the index over time have been drawn up, nor have conclusions been drawn from them so far.²

As the HICP-AP is a new index series not well known to the public, this study deals at length with providing a description of the index series. In addition, HICP-AP results are examined for Austria, the euro area and individual euro area countries. Interestingly, the share of the HICP-AP in the aggregate index tends to be larger in those countries that joined the euro area more recently, i.e. in countries that are still in transition. As a case in point, the HICP-AP accounts for 12.6% of the aggregate index in Austria, whereas its share is nearly twice as high in Slovakia at 23.6%.

¹ Oesterreichische Nationalbank, Economic Analysis Division, friedrich.fritzer@oenb.at. The author thanks Josef Auer, Ernest Gnan, Bettina Landau and Adrian Page for their comments. Any remaining errors and omissions are my own responsibility.

² Apart from a few analyses in the ECB's Monthly Bulletin, the author is aware of only one published analysis (Nierhaus, 2007).

Refereed by:
Josef Auer,
Statistics Austria;
Bettina Landau and
Adrian Page, ECB

In section 1, the basket of administered prices is defined. Goods and service prices in the Austrian basket are presented and the principles underlying the classification to “administered prices” are explained. Section 2 contains a descriptive statistical part and an econometric analysis of regulated prices. Section 3 concludes.

1 The Administered Prices Basket

The ECB and the Eurosystem NCBs prepared the ground for the HICP-AP index series over a period of nearly ten years. Predecessor indices of the HICP-AP now published by Eurostat were described in ECB Monthly Bulletins (March 2003, January 2004, May 2007).

Eurostat tested the indices prepared by the Eurosystem and first released its new HICP-AP series in early 2010 (Eurostat, 2010). The index currently in use has been labeled as “experimental” and will be subjected to a further verification round in early 2011.

1.1 Definition of Administered Prices

The HICP-AP basket contains the prices of all goods and services that are fully set or mainly influenced by the government (central, regional, local government including national regulators). The indices are produced monthly for all EU Member States and for the euro area as a whole. The HICP of administered prices is published with two subindices, namely the index of fully administered prices and the index of mainly administered prices.

Fully (“directly”) administered prices are the prices of goods and services directly set by the government. In Austria, public transportation charges or water supply and waste removal charges fall into this category. For the most part, classification of prices to this category is fairly straightforward.

In contrast, the range of items covered by the basket of mainly administered prices – *the prices of goods and services on which the government including any national regulator has a significant influence* – is less easy to define. The government may have a key influence on price-setting e.g. by making price changes subject to approval or by setting upper or lower price limits. The regulatory measures may have an impact both directly on final consumer prices as well as indirectly on the consumer prices through their influence on pricing in upstream production stages.

Various conventions and supplementary explanations provide guidance for determining whether the government influence on pricing is sufficient to incorporate prices into the HICP-AP. Even so, some room for interpretation will remain in many cases, mainly because the indirect effects of regulatory measures on consumer prices cannot be assessed reliably.

Hence, the following terms were established in the context of the HICP-AP (Eurostat, 2010):

- Governments or regulators set prices with the *explicit objective of influencing final consumer prices directly or indirectly*. Indirect influence on final consumer prices would exist if e.g. measures affected pricing in earlier production stages.
- The effect of *price regulation* is *long-term, not temporary*.
- *Price setting* is *subject to restrictions* such as price caps/floors.

Moreover, it was decided that the prices of the following goods and services should *not be included in the HICP-AP basket*:

- *Prices with a high share of indirect taxation and excise duties*, such as alcohol or tobacco. The influence the public sector has on inflation

developments through indirect taxes and excise duties is already reflected by the HICP at constant tax rates (HICP-CT).³

- Prices of *goods and services subject to safety or environmental standard regulations* are not to be included in the HICP-AP either, as their effect on consumer prices is extremely difficult to determine.
- *Prices subject to the Common Agricultural Policy in the EU* are not reflected by the HICP-AP either, as these regulations mainly have an influence on food products at an intermediate stage. Therefore, their impact on final consumer prices is very difficult to identify.
- Index-linked prices are not included in the HICP-AP basket unless the reference indicator for linking is an administered price or when the index linking is mandatory and enforced by regulation.

The definition is implemented at the COICOP four-digit level. The precision of the concept of administered prices is restricted among other things by the fact that the four-digit COICOP partly includes additional goods and services for which a decision has to be made whether their prices are administered or not. Cultural services represent such a subgroup: The Austrian basket included a total of 12 elementary aggregates in this group in 2010, among them nonadministered prices (e.g. the price of movie theater tickets) and fully administered prices (TV/radio fees). Based on table 1 (section 1.2), about 85% of cultural services belonged to the administered prices category, 15% to the non-administered prices category in 2010. As more than 50% of the four-digit COICOP prices fall under the HICP-

AP definition, the entire COICOP category 09.42 is classified to the HICP-AP.

Another judgment call is required to decide whether regulators exercise a major influence on final consumer prices if effects feed through to final consumer prices from earlier production stages. While the final decision on whether to include (mainly) administered prices in the HICP-AP is taken by Eurostat, the scope of the national HICP-APs is mainly defined at the decentral level. Therefore, there is no guarantee that identical cases will be treated identically and that the index will indeed be fully harmonized across countries.

Thus, comparisons of national HICP-APs must be seen against the background of this fuzziness and of the difficulty in developing a harmonized index across countries. Moreover, as stated above, the conceptual framework of the HICP-AP is such that it also measures price developments that are not influenced by public sector administration.

1.2 The Basket of Goods and Services in Detail

The basket of administered prices is revised yearly and is adapted if necessary. This process is needed because goods and services provided mainly or wholly by public suppliers or public service providers can increasingly be supplied by private enterprises.

Table 1 lists the prices covered by the Austrian HICP-AP. In addition to classifying prices as fully or mainly administered, the table contains the author's reasoning why a price is classified in the HICP-AP. Occasional comparisons to other euro area countries' HICP-AP are also included.

³ The HICP-CT, which is harmonized across countries, was first released by Eurostat in October 2009.

Basket of Administered Prices (October 2010)

COICOP		Type	Administered Products ¹	Brief Description of Price-Setting
Industrial goods excluding energy				
04.41	Water supply	DA	Water supply, variable and fixed costs	Water supply charges are set mainly by public suppliers (some 90% of water supply is provided by public-sector suppliers).
06.11	Pharmaceutical products	DA	Cold medicines, analgesics, oral contraceptives, vitamins and minerals, homeopathic medicine, prescription fees, skin and mucosa medicines	Retail prices are regulated by law or are subject to approval by public authorities.
Energy				
04.51	Electricity	DA	(up to October 2001); after that no longer administered	
04.52	Gas	DA	(up to October 2002); after that no longer administered	
Services				
04.42	Refuse collection	DA	Refuse collection (single family home)	Fees are set by local government.
04.43	Sewage collection	DA	Sewage collection fee (single family home)	Fees are set by public water suppliers or refuse collectors.
07.24	Other services in respect of personal transport equipment	DA	Parking fees/parking tax, toll, periodical assessment, driver's license fees, registration of a motor vehicle	Fees/prices are set by the federal government or by local governments.
07.31	Passenger transport by railway ²	DA	Railway ticket, adult; railway ticket, children; railway ticket, half price; benefit railcard, railcard (year, month, week); senior railcard	Prices are set by the Austrian Federal Railways.
07.32	Passenger transport by road	DA	Taxi ride by day, taxi ride by night	Prices set by regional governments.
07.35	Combined passenger transport	DA	Local passenger transport, day passes and long-term passes	Prices are set mainly by regional governments.
08.10	Postal services ²	DA	Inland postage, foreign postage	The Telekom regulation authority authorizes fees of Österreichische Post AG.
09.42	Cultural services	DA	Theaters, opera houses, concert halls, music halls, exhibitions, museums, Telekabel cable fees, TV broadcasting combination fee	Services are offered mainly by, and prices set by, public institutions.
06.21/3	Medical and paramedical services	MA	Physician (general practice and specialist practice), e-card	Prices are set by the social security institutions and the Austrian Medical Chamber.
06.22	Dental services	MA	Physician of choice (dentist)	Prices for medical services are negotiated by the Austrian Medical Chamber and the social security institutions.
06.30	Hospital services	DA	Nursing home costs, hospital costs	The public sector (regional and local governments) fix the amounts to be contributed by occupants or patients.

¹ Administered products classified within the four-digit COICOP aggregate.² Rail transport and postal services are no longer included in the HICP-AP from 2011.

(continued) Table 1

Basket of Administered Prices (October 2010)

COICOP		Type	Administered Products ¹	Brief Description of Price-Setting
Services				
10.00	Education	DA	Fees for kindergarten, school trips and university	Kindergarten, school and university fees are set by public authorities.
12.40	Social protection	DA	Retirement homes, afternoon care for children, nursery school, day care professional, home help	Fees determined by regional governments.
12.70	Other services n.e.c.	MA	Charge for a funeral service, fee for the cemetery, lawyer, payment of the services of estate agents, passport fees	Prices set by federal government (passport, agency fees for rental residences) or regional governments (burial costs, gravesite fees).

¹ Administered products classified within the four-digit COICOP aggregate.

Note: DA: directly administered; MA: mainly administered

Drinking water supply and pharmaceutical products, both classified under *nonenergy industrial goods*, are included in the HICP-AP (accounting for some 9% of administered prices).

Water supply (COICOP 04.41) and *sewage collection* (COICOP 04.43) are provided mainly by public suppliers (local governments) in Austria. The local governments also provide the connection to the water supply system and set the water use fees. The fees are generally linked to the national CPI. According to the Austrian Association for Gas and Water (OVGW, see references), public water suppliers serve some 90% of all Austrians; private water suppliers provide water to only about 10% of Austrians.

The retail prices of *pharmaceutical products* (COICOP 06.11) are regulated by law in Austria or are subject to approval. The wholesale trade prices of pharmaceuticals are also administered; markups are subject to a price cap.

Most administered prices – 91% – are in the *service sector*. These prices include residential (refuse collection), transport, health, social protection, education and postal services.

The local authorities are in charge of *refuse collection* (COICOP: 04.42), including price-setting.

Nearly two-thirds of the *other services in respect of personal transport equipment* (COICOP 07.24) are administered by public authorities (federal and local government).

This COICOP group includes e.g. parking fees/parking labels, toll facilities and driver's license fees. *Passenger transport by railway* (COICOP 07.31) is overwhelmingly provided by the Austrian Federal Railways (ÖBB), which also sets prices. While ÖBB constitutes a separate economic entity, it is 100% publicly owned. Consequently, the government has an influence on price-setting, but this influence cannot be unequivocally identified. Thus, classifying ÖBB-controlled prices to administered prices is a judgment call. Until 2010, the HICP-AP for Austria included passenger transport by railway, but this category has been excluded from 2011. Passenger transport by railway is treated differently in different euro area countries. It is not part of the HICP-AP in Germany and Spain, but is still in-

cluded in France's and other countries' HICP-AP.

Taxi fees in the COICOP category *passenger transport by road* (COICOP 07.32) and fees for local passenger transport combined passenger transport (COICOP 07.35) are set mostly by the regional authorities.

The fees for most *postal services* (COICOP 08.10) are set by Österreichische Post AG, with the Telecom regulation authority RTR having approval powers. The successive liberalization of postal services has opened the market to private postal service providers. Whereas postal services were still covered by the Austrian HICP-AP in 2010, they will be excluded from 2011 onward. In Germany, liberalization of the market for postal services led to the exclusion of postal services from the HICP-AP as early as 2007.

Cultural services (COICOP 09.24) are offered mainly by public providers. Pricing is partly administered, e.g. for theater, opera and music theater tickets. TV and radio fees are regulated by broadcasting law.

The fees for *medical and paramedical services* (COICOP 06.21/3) are negotiated between the Austrian social security sector and Austrian Medical Chamber.

Education (COICOP 10.00) contains the directly administered fees for kindergartens, schools, and universities, most of which are run by the public sector. The abolition of university tuition fees in 2010 applies only to Austrian citizens. Therefore, this COICOP sector remains covered by the HICP-AP. Kindergarten fees, too, have remained in the index, as only part of the fees parents have to pay for kindergarten attendance were waived in 2009.

Prices for *other services* (COICOP 12.70) are set by the federal government (passport fees, agency fees for rental residences) or by regional governments (burial costs, gravesite costs). Price caps apply for agency fees.

2 Cross-Country Analysis of Administered Prices

2.1 HICP Share of Administered Prices

The HICP share of administered prices varies strongly from one euro area country to another. In 2010, it was highest in Slovakia, Portugal, the Netherlands and Germany (chart 1) and ranged from 13.0% in Germany to 23.6% in Slovakia. Austria, with administered prices coming to 12.6% of the HICP basket, also exceeded the euro area average of 11.0%. The countries at the lower end of the range were Finland, Malta and Slovenia, with shares of 5.0% (Finland) to 6.4% (Slovenia).⁴

The relation of directly administered prices to mainly administered prices also differs strongly among euro area countries. Like Spain, Austria has mostly directly administered prices in the basket – the share is 80% in both countries. Vice-versa, the HICP-AP of Germany, Italy and France contains for the most part mainly administered prices. In Germany, the share of mainly administered prices in the HICP-AP is currently 78%; in France, mainly administered prices account for 71% and in Italy for 57%, respectively.

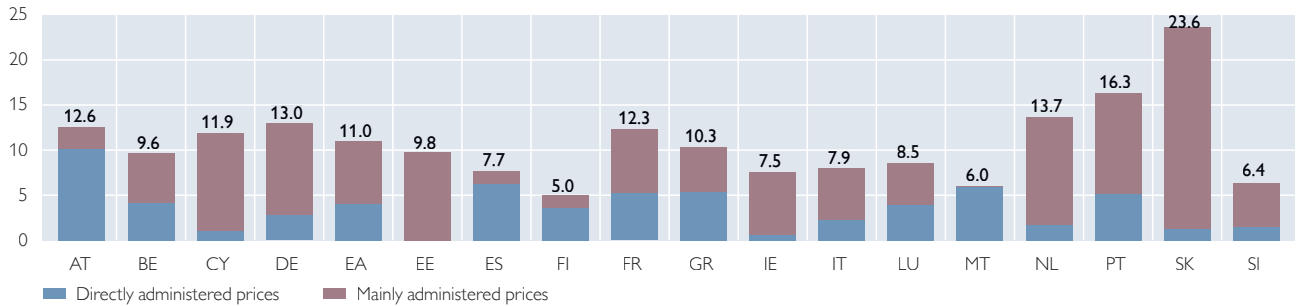
Different classifications of administered prices to either directly or partly administered prices were essentially found for hospital services, telephone and telefax services, road and rail transport services, refuse collection, sewage col-

⁴ As explained in section 1, the concept of administered prices contains scope for interpretation, which must be taken into account especially in cross-country comparisons. For example, the Austrian HICP-AP 2010 contains passenger transport by railway; the German one does not.

Chart 1

Weights of Administered Prices in the HICP Basket – Large Differences between Euro Area Countries' HICP-AP Shares

Percentage points



Source: Eurostat.

Note: Weights for 2010.

lection and postal services. Whereas the prices of the goods and services under these COICOP groups are typically classified as directly administered in Austria and Spain, they tend to be mainly administered prices in Germany, Italy and France.

The country weights of the HICP-AP have declined in the last decade.

The euro area average share of administered prices in the HICP dropped from 13.7% in 2001 to 11.0% in 2010 (chart 2), largely because energy markets were liberalized. As a result, some types of energy sources were no longer classified in the HICP-AP.

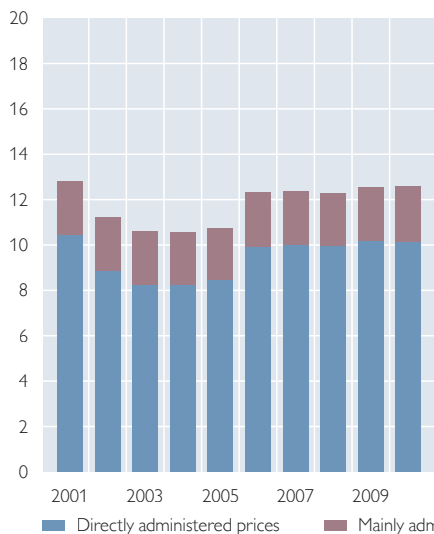
As a case in point, Germany's electricity market was liberalized in 2007,

Chart 2

Market Liberalization Reduces Share of Regulated Prices

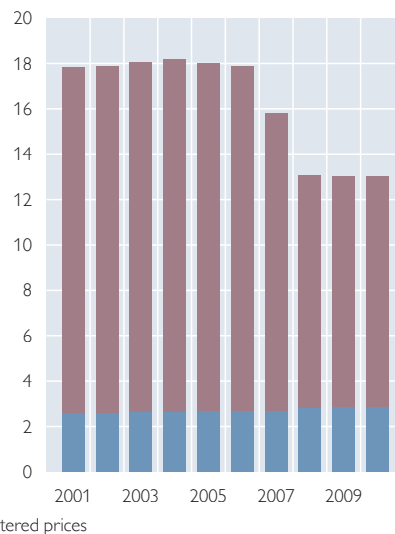
(a) Austria

HICP share in %



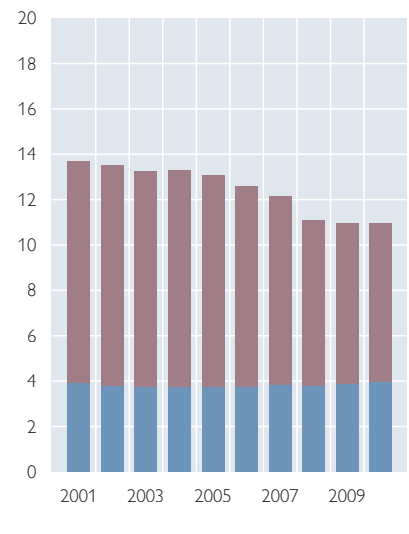
(b) Germany

HICP share in %



(c) Euro Area

HICP share in %



Source: Statistics Austria, Eurostat.

a circumstance reflected in the reduction of the share of directly administered prices in the HICP. The electricity market was already liberalized in 2001 in Austria. The gas market followed in 2002. As a result, the share of administered prices in the HICP declined markedly in Austria. The renewed rise of the weight of the HICP-AP in Austria in 2006 was above all caused by a statistical effect: Administered goods and services were accorded a greater weight in the basket to reflect the results of the new consumer survey.

2.2 Development of Prices, Inflation Rates and Inflation Contributions

2.2.1 Price Indices and Inflation Rates

Chart 3 shows the inflation rates of administered prices (HICP-AP) and of flexible prices (HICP-Flex) for Austria and the euro area since the availability of the basket of goods and services.

The data show that HICP-AP and HICP-Flex patterns differ sharply in Austria and in the euro area as a whole. Moreover, the annual rate of inflation

of administered prices is far more persistent than that of flexible prices.⁵ This trend was particularly apparent during the commodity price shock in 2007 to 2008, when HICP-Flex rates jumped, whereas HICP-AP rates moved largely sideways. Econometric evidence supports the interpretation of these two time series. Lünemann and Mathä (2005) demonstrate that for Austria and the euro area, the HICP rate excluding regulated prices has a higher persistence than the all-items HICP. While the index of administered prices in Lünemann and Mathä (2005) is not fully identical with the definition presented in this study, the two indices are largely consistent.

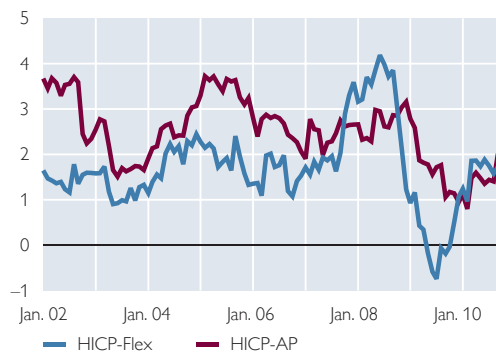
A further characteristic of both time series seems to be that the rate of inflation of administered prices is higher than that of flexible prices during phases of “normal” inflationary developments; the relationship is inverted during periods of sharply rising aggregate inflation. This phenomenon is partly due to the higher persistence of administered prices, but is also partly

Chart 3

Inflation of Administered Prices Exceeds Inflation of Flexible Prices on Average

Austria

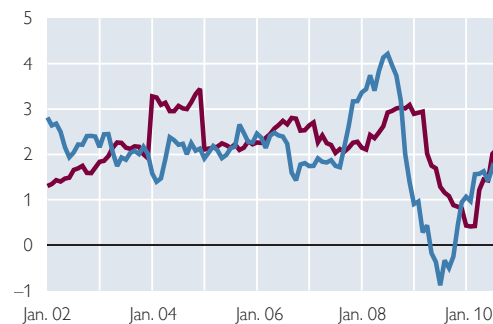
Annual change in %



Source: Statistics Austria, Eurostat.

Euro Area

Annual change in %



⁵ HICP-AP inflation surged or plummeted in some periods. This development may be the consequence of changes in regulated prices and/or of a change in the basket. For example, the share of administered prices in the entire basket diminished substantially in fall 2001 when gas and electricity were dropped from the HICP-AP.

Table 2

Descriptive Statistics of Various Inflation Rates – Averages for the Period from January 2001 to October 2010

	AT	BE	CY	DE	EA	EE	ES	FI	FR
	%								
Inflation HICP-Flex	1.7	2.2	2.4	1.5	2.0	3.7	2.9	1.5	1.8
Inflation HICP-AP	2.5	1.2	3.5	2.3	2.2	8.7	2.0	3.5	2.6
Inflation HICP	1.8	2.0	2.5	1.6	2.0	4.1	2.8	1.6	1.9
Inflation HICP-AP – inflation HICP-Flex	0.8	-1.0	1.2	0.8	0.2	5.0	-0.9	2.0	0.8

	GR	IE	IT	LU	MT	NL	PT	SK	SI
	%								
Inflation HICP-Flex	3.4	1.8	2.4	2.7	2.1	1.8	2.1	2.4	3.8
Inflation HICP-AP	2.9	7.1	1.0	3.1	7.9	2.2	3.0	8.6	4.3
Inflation HICP	3.4	2.1	2.2	2.7	2.4	1.8	2.2	3.8	3.8
Inflation HICP-AP – inflation HICP-Flex	-0.5	5.3	-1.3	0.4	5.8	0.4	0.8	6.2	0.5

Source: Author's calculations.

Note: Euro area changing composition (EA11–2000, EA12–2006, EA13–2007, EA15–2008, EA16–2010); HICP-Flex: HICP excluding administered prices, HICP-AP: HICP for administered prices.

due to the waiver of price increases for regulated prices during such periods.

Different inflation rate developments for administered prices in the euro area are frequently contingent on measures taken in some of the larger countries. For example, the temporary surge in the HICP-AP rate of inflation in the euro area in 2004 (chart 3) was caused mainly by the increase in German administered prices following a health reform.

Table 2 compares the average inflation rates of the HICP-AP, the HICP-Flex and the HICP from January 2001 to October 2010 for all euro area countries.

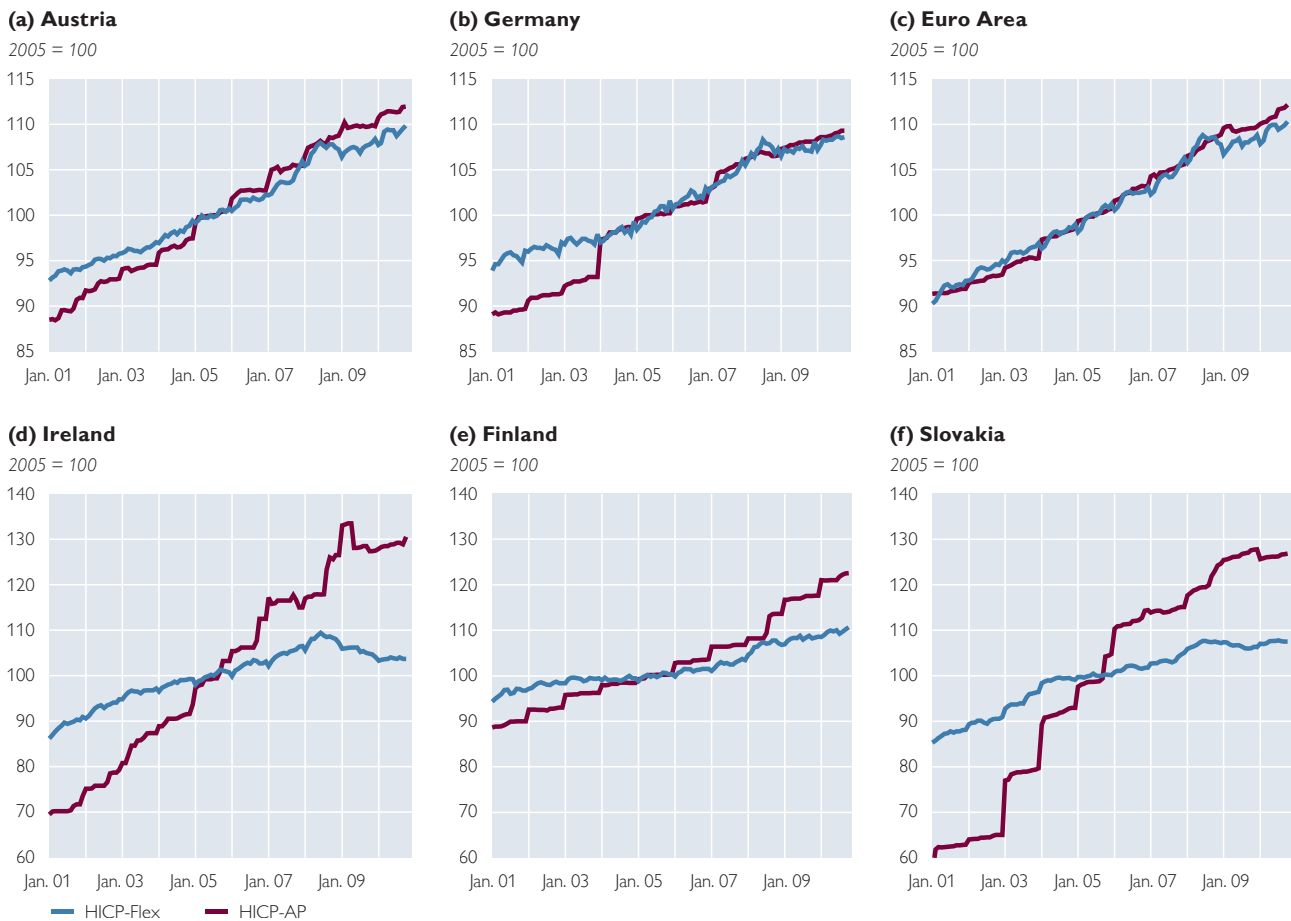
Since 2002 (the HICP-AP index series begins in January 2001, which is why there are no inflation rates for the HICP-AP for the period prior to 2002), the average inflation rate of administered prices (HICP-AP) of most euro area countries has been higher than that of the total index excluding administered prices (HICP-Flex). Belgium, Spain, Greece and Italy are exceptions. The rate of HICP-AP inflation came to

2.2% on average for the euro area, that of the HICP-Flex to 2.0%. In Austria as well as Germany, the gap between the HICP-AP and the HICP-Flex came to 0.8 percentage points. The gap was far smaller in the euro area, averaging 0.2 percentage points. This feature – the HICP-AP being higher than the HICP-Flex – is likely to be related to the fact that price changes of the HICP-AP are generally price increases and that, as Lünemann and Mathä (2005) have demonstrated for euro area countries, regulated prices are usually raised more than flexible prices.

Over time, the dynamics of administered prices have been far more pronounced than those of flexible prices in many countries – above all smaller countries like Ireland, Slovakia, Malta or Finland – as the patterns of the HICP-AP and HICP-Flex index series clearly show (chart 4).

The relatively stronger uptrend of administered prices apparent in chart 4 does not apply to all countries.

In addition to their stronger upward trend, administered prices are raised at

HICP-Flex and HICP-AP – Regulated Prices Exhibit a Clear Upward Trend

Source: Statistics Austria, Eurostat.

fairly regular intervals, frequently early every year. This pattern is quite prevalent in Finland and Slovakia, but also applies to Germany and Austria.

Whereas HICP-AP developments usually point upward, the HICP-Flex exhibits upward and downward movements.

In a different perspective, the differing development trends in the index series are also reflected in the correlation coefficients of inflation rates.

The correlation between the HICP inflation rate and the HICP-AP inflation rate averages 0.43 for the euro area and slightly more for Austria, i.e. 0.48.

Spain, Belgium and the Netherlands all diverge strongly from this average, with the Netherlands posting a coefficient close to zero, and Spain exhibiting an average that is less than half the euro area average. The correlation between HICP inflation and HICP inflation is in fact negative in Belgium.

The descriptive statistics in table 2 as well as the correlations in table 3 signal that the levels and the patterns of administered and of flexible price indices differ. Moreover, the connection between the price indices differs sharply among euro area countries.

Table 3

Correlation of HICP Inflation with Various Inflation Rates

	AT	BE	CY	DE	EA	EE	ES	FI	FR
HICP-Flex	0.99	0.99	0.97	0.94	1.00	0.99	0.99	1.00	0.99
HICP-AP	0.48	-0.03	0.68	0.34	0.43	0.66	0.16	0.35	0.41
HICP-APM	0.47	0.23	0.25	0.12	0.30	x	0.26	0.35	0.28
HICP-APP	0.10	-0.36	0.69	0.35	0.38	0.66	-0.41	0.07	0.46
	GR	IE	IT	LU	MT	NL	PT	SK	SI
HICP-Flex	0.99	0.99	0.96	0.99	0.96	0.97	1.00	0.88	1.00
HICP-AP	-0.20	0.45	0.41	0.34	0.49	0.06	0.38	0.90	0.49
HICP-APM	-0.31	0.48	-0.17	0.03	0.49	0.34	-0.02	0.83	0.60
HICP-APP	0.07	0.40	0.48	0.49	-0.35	-0.03	0.43	0.88	0.28

Source: Author's calculations.

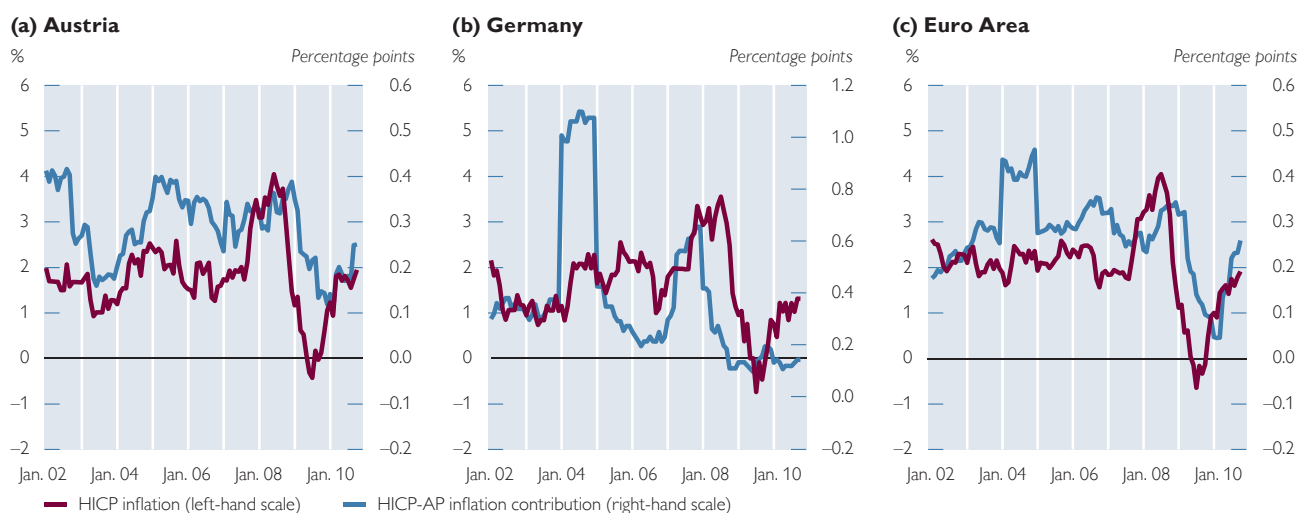
Note: Euro area changing composition (EA11–2000, EA12–2006, EA13–2007, EA15–2008, EA16–2010); HICP-Flex: HICP excluding administered prices, HICP-AP: HICP for administered prices, HICP-APM: HICP for fully administered prices, HICP-APP: HICP for mainly administered prices

2.2.2 Inflation Contributions of Administered Prices

In most euro area countries, administered prices contribute substantially to overall inflation (weight of the HICP-AP multiplied by the inflation rate of the HICP-AP). The contributions in Austria have fluctuated between 0.10 and 0.42 percentage points since 2002;⁶

the range in Germany is from 0.10 to 1.10 percentage points. Administered prices made the highest contribution to overall inflation in Germany in the wake of the health reform of 2004. The euro area fluctuation range in the same period came to between 0.04 and 0.46 percentage points.

Chart 5

HICP Inflation and Contributions by Administered Prices

Source: Eurostat, Statistics Austria.

⁶ January 2002 to October 2010.

Over time, inflation contributions exhibit a conspicuously parallel development to HICP inflation, a trend which is spectacularly broken at certain intervals, as in the case of the health reform in Germany in 2004. This special pattern even feeds through to the inflation contribution of the euro area aggregate.

2.3 To What Extent Do Administered Prices Influence Inflation Developments?

Are regulated prices a factor that accelerates inflation? To establish the causality link between the HICP inflation rate and the HICP-Flex inflation rate or the HICP-AP inflation rate at the purely statistical level, bivariate Granger causality tests were performed. The results are presented below. The tests were conducted in both directions, evaluating the influence of HICP inflation as well as HICP-Flex inflation on HICP-AP inflation and vice versa. These tests were performed on the basis of monthly data for monthly time lags up to 13 months. A prerequisite for the validity of the tests is that the time series to which they are applied are stationary. Taking into account structural breaks in inflation developments, it may be assumed that this characteristic applies for most euro area countries (Kyung So et al., 2010).

Table 4 shows the results of the Granger causality tests for lags 1, 6, 12 and 13.⁷

Some interesting observations about causality may be made: For Austria, the direction of causality clearly runs from

the HICP-Flex inflation rate (and the all-items HICP⁸) to the HICP-AP. At the 5% significance level, this causality has been confirmed for all monthly lags up to one year other than the three-month and six-month lags. The fact that this direction of causality does not hold beyond 12 months may be attributable to the fact that some administered prices in Austria are indexed to the national CPI. In most cases, indexation is based on the average inflation rate of the previous year, with the adjustment usually being made once a year rather than continuously.

In the euro area as well as in Spain (in particular the lags from the fourth month onward), Belgium, the Netherlands (lags 3 to 6), Portugal (lags 1 and 2), Cyprus, Estonia, Finland, France (at the 10% confidence level) and Slovenia, the direction of causality runs from the HICP-Flex inflation rate to the HICP-AP inflation rate. The causality is reversed for Italy, running from HICP-AP inflation to HICP-Flex inflation (for lags 9 to 12). Countries for which the direction of causality appears to be unclear were Germany, Luxembourg, Slovakia and Ireland.

Overall, these results would imply that public sector pricing significantly influences overall inflation and the development of the inflation of flexible prices in Austria and in some other euro area countries, but that it is not a leading indicator for the future development of inflation.

The section below focuses on identifying other important determinants of the cost side and the demand side.

⁷ The complete results (among other things for the lags for every month) are available on request.

⁸ Table 4 does not contain the statistics of the Granger causality tests between total inflation and administered price inflation, but they are available on request.

Table 4

Pairwise Granger Causality Tests (January 2001 to October 2010)

	AT	BE	CY	DE	EA	EE	ES	FI	FR
First lag									
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.24	0.01	0.85	0.10	0.03	0.00	0.00	0.06	0.05
Infl-AP is not caused by Infl-Flex: P-value	0.03	0.05	0.03	0.13	0.00	0.00	0.00	0.00	0.00
	GR	IE	IT	LU	MT	NL	PT	SK	SI
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.22	0.01	0.00	0.98	0.12	0.13	0.11	0.91	0.92
Infl-AP is not caused by Infl-Flex: P-value	0.63	0.01	0.00	0.46	0.04	0.32	0.02	0.24	0.57
	AT	BE	CY	DE	EA	EE	ES	FI	FR
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.72	0.69	0.48	0.35	0.65	0.58	0.10	0.28	0.47
Infl-AP is not caused by Infl-Flex: P-value	0.04	0.02	0.00	0.94	0.01	0.00	0.01	0.00	0.06
	GR	IE	IT	LU	MT	NL	PT	SK	SI
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.32	0.39	0.02	0.25	0.01	0.48	0.21	0.42	0.97
Infl-AP is not caused by Infl-Flex: P-value	0.87	0.00	0.01	0.86	0.41	0.02	0.10	0.04	0.00
	AT	BE	CY	DE	EA	EE	ES	FI	FR
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.60	0.14	0.75	0.42	0.36	0.97	0.21	0.03	0.92
Infl-AP is not caused by Infl-Flex: P-value	0.08	0.00	0.00	0.98	0.02	0.02	0.00	0.00	0.26
	GR	IE	IT	LU	MT	NL	PT	SK	SI
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.02	0.00	0.06	0.05	0.19	0.00	0.21	0.09	0.65
Infl-AP is not caused by Infl-Flex: P-value	0.82	0.01	0.34	0.66	0.70	0.00	0.22	0.00	0.08
	AT	BE	CY	DE	EA	EE	ES	FI	FR
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.18	0.15	0.96	0.30	0.59	0.38	0.55	0.27	0.97
Infl-AP is not caused by Infl-Flex: P-value	0.16	0.02	0.01	0.91	0.15	0.00	0.03	0.00	0.28
	GR	IE	IT	LU	MT	NL	PT	SK	SI
Null hypothesis:									
Infl-Flex is not caused by Infl-AP: P-value	0.03	0.01	0.15	0.06	0.24	0.00	0.47	0.00	0.85
Infl-AP is not caused by Infl-Flex: P-value	0.64	0.00	0.85	0.75	0.80	0.39	0.63	0.02	0.03

Source: Author's calculations.

Note: Shaded values indicate the rejection of the null hypothesis. Infl-AP: Inflation rate of administered prices; Infl-Flex: Inflation rate of total inflation excluding administered prices.

2.4 Cost Shocks Influence Flexible Prices More Strongly and Administered Prices Less Strongly

A more in-depth analysis of the causal relationships was attempted on the basis of an impulse-response functions derived from an unrestrictive VAR model (vector autoregressive model). This econometric approach captures

the interaction between the administered inflation rates and the macroeconomic environment, making it possible to take into account the direct and the indirect inflation effects of cost and demand shocks on the endogenous variables. Administered prices and flexible prices are subject to different mechanisms. Frequently, official or legislative

measures play a key role and significantly influence both the frequency and the size of price adjustments.

The VAR model contains the variables crude oil prices, the gap between the long-term and the short-term interest rate, the output gap, and the HICP-AP. In a further variant, the HICP-AP is replaced by the HICP-Flex⁹ to determine the difference between cost and demand shocks on regulated versus flexible prices. Given the rather short time series (the HICP-AP is available only from January 2001), two variants of VAR models with three variables each were specified. The VAR systems differ only with respect to the use of inflation as measured by the HICP and inflation as measured by the HICP-AP. Crude oil prices were used as a proxy for macroeconomic costs, and the output gap served as an indicator of demand effects.

All variables with the exception of the output gap, which is fed into the VAR model without having been transformed, are included in the model in logarithmic form and in quarterly differences. Therefore, the transformed variables may be interpreted as quarterly growth rates.

The sequencing of the variables in the VAR system plays a fundamental role for the impulse-response analysis. The order in this analysis was: crude oil prices, interest rate spread, output gap, HICP-AP (or HICP-Flex in the second model variant). The consequences of this technical assumption for the results are fully plausible: The assumption is that a crude oil price shock has contemporaneous effects on all other variables, but at the same time, crude oil prices are not influenced by any of the other

residuals in the same period. The same applies by analogy to all other determinants. For instance, monetary policy measures – these are captured by the interest rate spread – have a contemporaneous impact on the output gap and the HICP-AP (or the all-items HICP), but not on the crude oil price.

2.4.1 Cost Shocks

Based on the standard deviation of monthly changes in crude oil prices, one-standard-deviation shocks are clearly found to have a significant effect on total inflation as well as HICP-Flex inflation in the first two quarters in most euro area countries.¹⁰

The impulse response of HICP-AP inflation goes in the same direction as the impulse response of HICP-Flex inflation, but the impact of the crude oil price shock on the HICP-AP is not statistically significantly different from zero in most cases. For Austria, the impulse response is significantly positive in the first quarter (chart 6).

The following observation applies with reference to the magnitude of the response: The size of the crude oil price shock is one standard deviation of the quarterly rates of change. In the period from the first quarter of 2002 to the third quarter of 2010, the standard deviation came to 0.17 percentage points. This corresponds to an increase of about 15% in the price of crude oil.

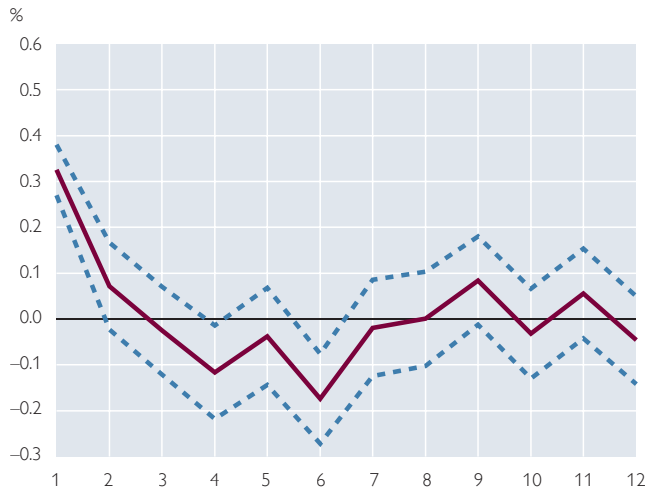
For Austria, the contemporaneous effect on the quarterly inflation rate is 0.33 percentage points, somewhat more than the effect for Germany at 0.29 percentage points (chart 6). The effect of the crude oil price shock lasts for only two quarters, after which it is no longer significant. Other studies

⁹ VAR models were also estimated with overall inflation rather than HICP-AP inflation or HICP-Flex inflation.

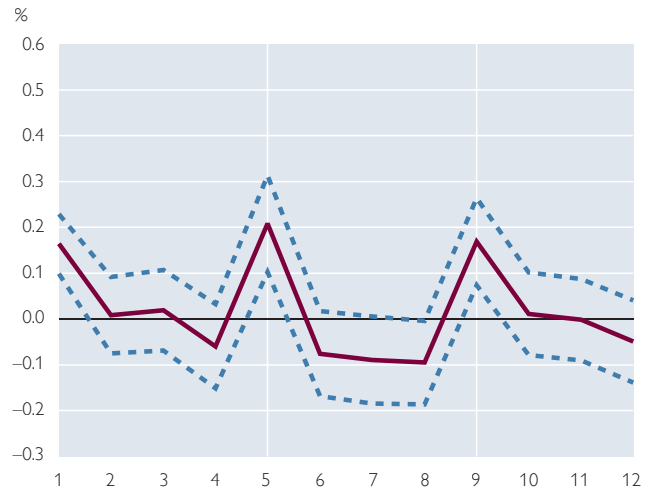
¹⁰ Malta is the sole exception; here, various impacts that are statistically not significantly different from zero were measured.

Smaller Reaction of Administered Prices to a Crude Oil Price Shock

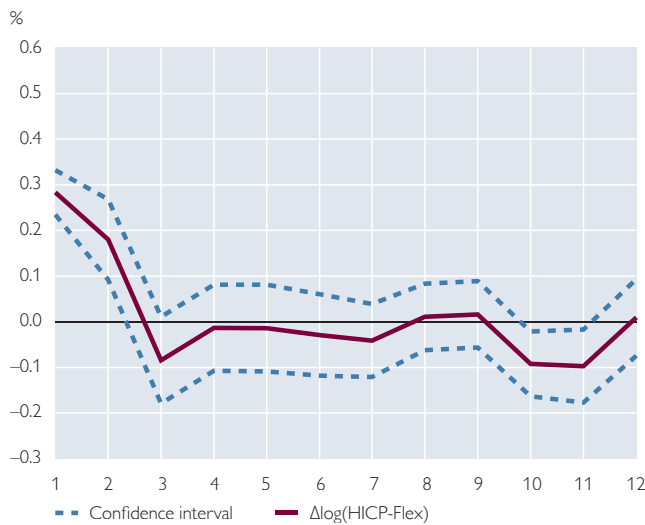
Austria: Impulse Response of HICP-Flex Inflation



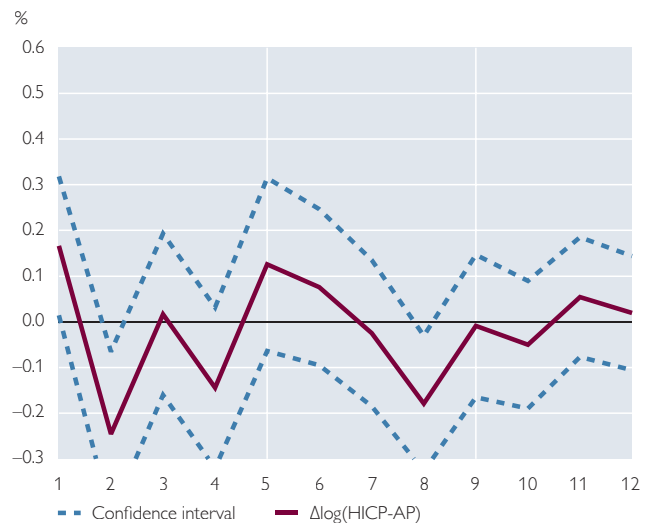
Austria: Impulse Response of HICP-AP Inflation



Germany: Impulse Response of HICP-Flex Inflation



Germany: Impulse Response of HICP-AP Inflation



Source: Author's calculations.

about euro area countries come to similar conclusions (Galesi and Lombardi, 2009).

The impulse response of HICP-AP inflation is smaller than that of HICP-Flex inflation. For Germany, it is not significantly different from zero, whereas it is significantly positive for Austria for the first quarter (+0.16 percentage points). The “aftereffect” of the crude oil price shock on Austrian

administered prices is still evident after five and after nine quarters. This effect could be linked to the indexation of many regulated prices to the national CPI. Indexation is especially prevalent for federal government fees, partly also for fees set by regional authorities, and consists in the adjustment of administered prices for the inflation rate of the previous year.

2.4.2 Demand shock

An impulse-response analysis was also made for demand shocks; it measures the effect on HICP-AP inflation and HICP-Flex inflation of changes in the domestic output gap. The output gap shock is shown not to have a significant influence on price variables. This means that the effect of demand developments on inflation – at least those demand developments that are measured with the output gap – is less important than that of cost shocks. This outcome may be contingent on the fact that inflation expectations in the euro area were firmly anchored during the observation period (from 2001 to 2010), so that demand effects on price developments had no effect or only a weak effect on price developments.

It must be emphasized, however, that this result is considered controversial in the literature. While other studies have been able to prove that demand effects on inflation have increasingly lost ground in recent years, it has not been established that the output gap has become completely unimportant as a determinant of inflation developments. For example, in Rumler and Valderama (2008), the question of demand effects on inflation developments in euro area countries is examined with the help of Phillips curve estimates. The authors demonstrate that the output gap ceased to have statistically significant effects on inflation developments in several euro area countries in the 1990s. However, this is not the case for all countries. Moreover, the estimation results are not unambiguous for Austria: The diminishing importance of the output gap can be proved on the basis of the traditional Phillips curve, but these results are not confirmed by the results on the basis of the New Keynesian Phillips Curve. A further study by Musso et al. (2009) deals with

the issue of the instability of the Phillips curve for the euro area. The authors determine that the output gap continues to have a significant effect for the euro area as soon as the instabilities are explicitly modeled, in particular the reduction in the mean shift of the inflation rate and the varying steepness of the Phillips curve.

3 Conclusions

Administered prices are a key component of the HICP basket, accounting for 11.0% of the HICP (euro area average). Among euro area countries, this share ranges from 5.0% in Finland to 23.6% in Slovakia. With a share of 12.6%, Austria surpasses the euro area average. Market liberalization tends to reduce the weight of regulated prices in the HICP. Their share declined by nearly 3 percentage points in the euro area in the past decade. The share of regulated prices in the HICP basket declined moderately in Austria in the same period.

The inflation rates of administered prices and those of flexible prices (i.e. the HICP excluding administered prices) differ with respect to both their levels and their development over time. In Austria, Germany and France, the average HICP-AP inflation rate has been noticeably higher since 2002 than average HICP-Flex inflation rates, whereas the situation was reversed in Italy and Spain.

Overall, the link between both administered and flexible price inflation and headline inflation is small (Spain) or there is even no evidence of such a link (Belgium, the Netherlands).

The examination of the direction of the effect also raised interesting aspects in this study: Administered prices may represent a significant part of the rate of inflation, but they are not necessarily to be seen as an accelerator of inflation. Granger causality tests were used to

prove that flexible prices are a leading indicator for Austria and a number of other euro area countries, not vice versa.

As public sector pricing also reacts to the macroeconomic environment, an attempt was made to identify key macroeconomic determinants. It was found that above all, cost determinants – an oil price shock – are important for price developments. In most euro area countries, overall inflation as well as the inflation of flexible prices displays a statistically significant rise after a shock to crude oil prices. As a rule, the effect is short-term. A statistically significant impact can no longer be determined after two quarters. It is also interesting

that the impulse response of HICP-AP inflation is smaller than that of HICP-Flex inflation, and that it is not even significant for the most part.

This study finds that unlike cost shocks, demand shocks do not have statistically significant effects on prices. Changes in the output gap have no statistically significant impact on either HICP-AP inflation or HICP-Flex inflation. The literature does not provide unambiguous confirmation of this result. Whereas some studies prove that the importance of the output gap for inflation developments declines, the extreme of statistical insignificance remains controversial.

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